CLAIMS:

1. A method comprising:

storing route data representing routes within a computer network;

storing next hop data representing network devices neighboring a network router; and

storing indirect next hop data that maps at least a subset of the routes represented by the route data to a common portion of the next hop data.

2. The method of claim 1, wherein storing route data comprises storing a radix tree having a set of leaf nodes, wherein each leaf node corresponds to a destination within the network.

3. The method of claim 2, wherein storing the indirect next hop data comprises:

storing a reference to a primary next hop, and

storing a reference to a backup next hop.

4. The method of claim 3, further comprising routing packets to the backup next hop in response to a network event.

5. The method of claim 2, wherein storing the indirect next hop data comprises storing a data pointer within each of the leaf nodes.

6. The method of claim 1, wherein storing the next hop data comprises storing an array of next hop data elements, and further wherein the common portion of the next hop data comprises at least one next hop data element.

7. The method of claim 1, further comprising:

receiving a packet comprising network update information; and

modifying the common portion of the next hop data in response to the network update information.

8. The method of claim 1, further comprising:

storing routing information within a routing engine, wherein the routing information represents routes within a network; and

storing the route data, the indirect next hop data and the next hop data within a packet forwarding engine.

9. The method of claim 8, further comprising:

receiving a packet comprising network topology update information;

updating the routing information within the routing engine; and

issuing a message from the routing engine to direct the packet forwarding engine to modify the common portion of the next hop data in response to the network update information.

10. The method of claim 8, wherein storing the routing information includes storing a copy of the route data, the indirect next hop data and the next hop data stored within the packet forwarding engine.

11. The method of claim 9, wherein storing the routing information includes storing a copy of the route data, the indirect next hop data and the next hop data stored within the packet forwarding engine, and issuing the message comprises analyzing the copy to identify the next hop for modification.

12. A computer-readable medium having data structures therein comprising:

a first data structure to store route data representing destinations within a computer network;

a second data structure to store next hop data representing interfaces to neighboring network devices; and

a set of data structures to store indirect next hop data that map at least a subset of the route data to a common portion of the next hop data.

13. The computer-readable medium of claim 12, wherein the first data structure stores a radix tree having a set of leaf nodes, wherein each leaf node corresponds to a destination within the network.

14. The computer-readable medium of claim 12, wherein the indirect next hop data comprises a set of data pointers stored within the leaf nodes.

15. The computer-readable medium of claim 14, wherein the data pointers include pointers to primary next hops and pointers to backup next hops.

16. The computer-readable medium of claim 12, wherein the second data structure comprises an array of the next hop data elements.

17. A router comprising a computer-readable medium to store: (i) route data representing routes within a computer network, (ii) next hop data representing neighboring network devices, and (iii) indirect next hop data that maps at least a subset of route data to a common portion of the next hop data.

18. The router of claim 17, wherein the indirect next hop data comprises a set of data pointers stored within the leaf nodes.

19. The router of claim 18, wherein the data pointers include pointers to primary next hops and pointers to backup next hops.

20. The router of claim 17, wherein some of the next hop data represents software modules for processing data packets.

21. The router of claim 20, wherein each of the software modules is selected from one of a packet filter, a policy enforcer and a packet counter.

22. The router of claim 17, wherein the route data is arranged to form a radix tree having a set of leaf nodes corresponding to destinations within the network.

23. The router of claim 22, wherein the indirect next hop data includes a set of data pointers associated with the leaf nodes.

24. A router comprising:

a routing engine to store routing information representing a topology of a network; and

a packet forwarding engine to store packet forwarding information in accordance with the routing information, the packet forwarding information including (i) route data representing destinations within a computer network, (ii) next hop data representing interfaces to neighboring network devices, and (iii) indirect next hop data that maps a subset of the routes represented by the route data to a common portion of the next hop data.

25. The router of claim 24, wherein the routing engine receives a packet comprising network topology update information and, in response to the network topology update information, updates the routing information and directs the packet forwarding engine to modify one of the next hop data.

26. The router of claim 24, wherein the routing information includes data structures storing a copy of the route data, the indirect next hop data and the next hop data stored within the packet forwarding engine.

27. The router of claim 26, wherein the routine engine analyzes the data structures to identify the next hop for modification.

28. A computer-readable medium having instruction therein for causing a programmable processor within a router to:

store route data representing routes within a computer network;

store next hop data representing network devices neighboring a network router; and

store indirect next hop data that maps at least a subset of the routes represented by the route data to a common portion of the next hop data.

29. The computer-readable medium of claim 28, wherein the instructions cause the processor to store route data comprises storing a radix tree having a set of leaf nodes, wherein each leaf node corresponds to a destination within the network.

30. The computer-readable medium of claim 29, wherein the instructions cause the processor to store a data pointer within each of the leaf nodes.

31. The computer-readable medium of claim 28, wherein the instructions cause the processor to store an array of next hop data elements, and further wherein the portion of the next hop data comprises at least one next hop data elements.

32. The computer-readable medium of claim 28, the instructions cause the processor to:

receive a packet comprising network update information; and

modify the common portion of the next hop data in response to the network update information.

33. The computer-readable medium of claim 28, the instructions cause the processor to:

store routing information within a routing engine, wherein the routing information represents routes within a network; and

store the route data, the indirect next hop data and the next hop data within a packet forwarding engine.

34. The computer-readable medium of claim 33, the instructions cause the processor to:

receive a packet comprising network topology update information;

update the routing information within the routing engine; and

issue a message from the routing engine to direct the packet forwarding engine to modify the common portion of the next hop data in response to the network update information.

35. The computer-readable medium of claim 33, wherein the instructions cause the processor to store a copy of the route data, the indirect next hop data and the next hop data stored within the packet forwarding engine.

36. The computer-readable medium of claim 33, wherein the instructions cause the processor to store a copy of the route data, the indirect next hop data and the next hop data stored within the packet forwarding engine, and issuing the message comprises analyzing the copy to identify the next hop for modification.

37. A method comprising routing packets within a network using indirect next hop data that associates a plurality of routes with a common portion of next hop data.

38. The method of claim 37, further comprising
storing route data; and
storing the next hop data.

39. The method of claim 37, further comprising storing pointers to primary next hops and pointers to backup next hops.

40. The method of claim 38, wherein storing the route data comprises storing a radix tree having a set of leaf nodes, wherein each leaf node corresponds to a destination within the network, and further wherein storing the indirect next hop data comprises storing a data pointer within each of the leaf nodes.

41. The method of claim 37, further comprising:
receiving a packet comprising network update information; and
modifying the common portion of the next hop data in response to the network update information.

42. The method of claim 37, further comprising storing the indirect next hop data within a packet forwarding engine.

43. The method of claim 42, further comprising:

receiving a packet comprising network topology update information;

issuing a message from a routing engine to direct the packet forwarding engine to modify the common portion of the next hop data in response to the network update information.

44. The method of claim 42, further comprising storing a copy of the indirect next hop data within a routing engine.